

CLAIMS

1. A DC-DC converter comprising:

a transformer having primary side terminals, secondary side terminals, a primary side winding, and a secondary side winding  
5 and determining a voltage converting ratio;

a pair of switching means which is interposed between said primary side terminals and said primary side winding,

a LC resonant circuit comprised of a resonating reactor connected in series with said pair of switching means, and a resonating  
10 capacitor that resonates with said resonating reactor; and

a driving means for alternately turning said pair of switching means ON/OFF, wherein:

a resonant current detecting means for detecting a resonant current caused by an operation of said LC resonant circuit and means  
15 for feeding a detected output of said resonant current detecting means back to said driving means are provided; and

said driving means drives said pair of switching means by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the  
20 detected output of said resonant current detecting means.

2. The DC-DC converter according to claim 1, wherein said resonant current detecting means is provided on the primary side of said transformer.

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3. A bi-directional DC-DC converter comprising:

a transformer having low-voltage side terminals, high-voltage side terminals, a low-voltage side winding, and a high-voltage side winding and determining a voltage converting ratio;

a low-voltage side pair of switching means interposed between  
5 said low-voltage side terminals and said low-voltage side winding;

a high-voltage side pair of switching means interposed between said high-voltage side terminals and said high-voltage side winding;

a low-voltage side rectifying element connected in parallel with each of switching elements in said low-voltage side pair of  
10 switching means;

a high-voltage side rectifying element connected in parallel with each of switching elements in said high-voltage side pair of switching means; and

a driving means for turning ON/OFF the switching elements in  
15 said low-voltage side pair of switching means and the switching elements in said high-voltage side pair of switching means, wherein:

a LC resonant circuit is interposed between said high-voltage side winding and said high-voltage side pair of switching means or between said low-voltage side winding and said low-voltage side  
20 pair of switching means;

a resonant current detecting means for detecting a resonant current caused by an operation of said LC resonant circuit and means for feeding a detected output of said resonant current detecting means back to said driving means are provided; and

25 said driving means drives said low-voltage side pair of switching means or said high-voltage side pair of switching means

by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the detected output of said resonant current detecting means.

5           4. The DC-DC converter according to claim 3, wherein said LC resonant circuit is interposed between said high-voltage side winding and said high-voltage pair of switching means.

10           5. The DC-DC converter according to claim 3, wherein said low-voltage side pair of switching means and said high-voltage pair of switching means are each configured by interconnecting four switching elements in a bridge.